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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/629,172

07/31/2000

Nadim Haddad

032908-008

4792

21839

7590

02/24/2005

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EXAMINER

POMPEY, RON EVERETT

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/629,172

Applicant(s)

HADDAD ET AL.

Examiner

Ron E. Pompey

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abiko et al. (EP 0 880 174 A1) in further view of Pfister et al. (US 4,728,619).

3. Abiko discloses the steps of:

depositing a layer of pad oxide (2, fig. 2A) on a semiconductor substrate;

selectively etching said pad oxide layer and said semiconductor substrate to

define a trench (3, fig. 2A) within said semiconductor substrate;

implanting boron ions (fig. 2B or 6) at an angle with respect to normal in said trench;

wherein said boron ion implantation is performed with an energy greater than about 20 KeV and a dose of boron ions in a range between approximately  $10^{10}$  atoms/cm<sup>2</sup> and  $10^{13}$  atoms/cm<sup>2</sup>; and

further including the step of implanting a p-type material to form a P-well (7, fig. 2C) having a depth greater than the depth of said trench (col. 3, ln. 40 – col. 4, ln. 16).

4. Abiko fails to disclose some or all the limitations of:

implanting an electrical neutral material into said substrate; and

wherein said electrically neutral material is implanted to a depth, which is no greater than the depth of a diffusion region in said P-well.

However, Pfiester discloses the limitations of:

implanting an electrically neutral material (x/54, figs. 5/6) into said substrate, to a depth, which is no greater than the depth of a diffusion region (o/50, figs. 5/6) in said P-well (col. 5, lns. 5-40 and col. 6, lns. 1-24).

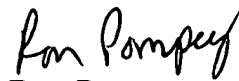
Therefore it would have been obvious to those of ordinary skill in the art at the time of the invention to combine Pfiester with Abiko, because the implanted neutral material will provide for more precise placement of boron directly beneath the isolation region during subsequent heat cycles. Also, even though Pfiester is disclosing a field oxide isolation and not a trench isolation the same method can be applied. The germanium can be implanted into the walls of the trench of Abiko right after or simultaneously with the boron, like in Pfiester. Because the diffusion of boron that would occur during the filling of the trench and subsequent heat cycles, in Abiko, is the same diffusion of boron that occurred, in Pfiester, during the field oxide growth and subsequent heat cycles.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E. Pompey whose telephone number is (571) 272-1680. The examiner can normally be reached on compressed.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Ron Pompey  
AU:2812  
February 22, 2005

  
MICHAEL S. LEBENTRITT  
PRIMARY EXAMINER